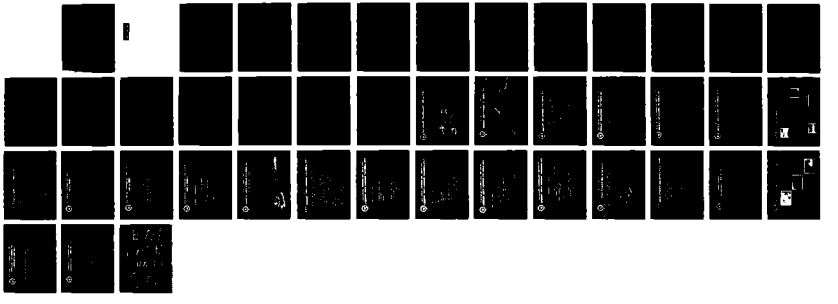
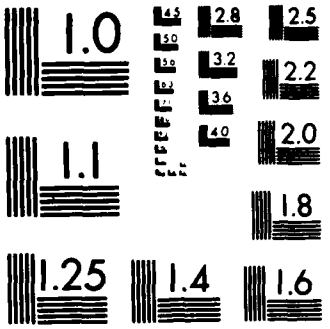
AD-A191 841 DEPARTMENT OF DEFENSE STATEMENT ON THE BALANCED TECHNOLOGY INITIATIVE TO T..(U) OFFICE OF THE DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING WA.. R C DUNCAN 1/1

UNCLASSIFIED 11 APR 88 F/G 5/1 NL





Good afternoon. I am Robert C. Duncan, Director of Defense Research and Engineering. It has been my pleasure to appear before you on numerous previous occasions, both in my present position and earlier as Director of the Defense Advanced Research Projects Agency (DARPA), to discuss various aspects of Department of Defense Research, Development, Test, and Evaluation (RDT&E) programs. I am pleased to be here again today to discuss the Balanced Technology Initiative (BTI). In my prepared statement, I will review certain background details regarding the establishment of the program by Congress and its subsequent development and implementation within DoD, address important program management and funding issues, cite some early program accomplishments, and close with a discussion of the military significance of BTI program activities.

Background

The Balanced Technology Initiative was established in Fiscal Year 1987 by the 99th Congress to provide additional support for the development of "promising new technologies that could substantially advance our conventional defense capabilities." Responsibility for the development of BTI program details was assigned to the Director of Defense Research and Engineering. Funds to initiate the program were appropriated directly to the Office of the Secretary of Defense (OSD) for subsequent apportionment to the Services and the Defense Agencies.

As stated in the National Defense Authorization Act for Fiscal Year 1987, these funds were to be used to "expand research on innovative concepts and methods of enhancing conventional defense capabilities," and to promote "restoration of the conventional defense technology base." Some of this language was repeated in the Authorization Act for Fiscal Years 1988 and 1989, which also emphasized the need "to take full advantage of the technological superiority of the United States and its allies..." to effectively counter the capabilities and tactics of the Soviet Union and other Warsaw Pact countries.

A detailed and substantive BTI program plan was subsequently developed by technical and operational experts within the Department of Defense. The process involved extensive participation by the Army, Navy, and Air Force. A comprehensive report describing the program planning process, specific objectives and the military significance of each selected project, and providing funding profiles required to maintain program progress over a five-year period, was submitted to Congress in May 1987. The report also provided additional requested information pertaining to the applications of technology developed under the Strategic Defense Initiative (SDI) program to conventional defense, as well as certain details of ongoing conventional defense research and development by the Defense Agencies and the Services.

The Balanced Technology Initiative program was structured to "make a difference" in a few technology areas considered critical to the successful conduct of conventional defense missions. The program includes work in five categories:

(1) Smart Weapons Technology. The overall objective of this work is to accelerate the advancement of technologies important to the development of next-generation, fire-and-forget, autonomous weapons employed by conventional forces. Such weapons can provide significant force-multiplier advantages for both short- and longer-range engagements. The work includes efforts involving advanced sensors and seekers, autonomous guidance and automatic target recognition (ATR), and addressing the producibility of components.

(2) RSTA/BMC3 Technology (RSTA - for Reconnaissance, Surveillance, and Target Acquisition; BMC3 - for Battle Management, Communications, Command, and Control). The overall objective of this work is to advance technologies important in obtaining, processing, passing, and using information vital to maximizing the battlefield effectiveness of conventional forces. The work includes developments in the areas of surveillance and targeting, as well as efforts related to information management.

(3) Armor/Anti-Armor Technology. The overall objective of this work is to promote increased survivability and more effective retaliatory warfighting capabilities for US and Allied

conventional forces, primarily those forces involved in ground combat. The projects included in this category are intended to complement or supplement ongoing activities included in the joint DARPA/Army/Marine Corps program. The work involves projects in the areas of advanced guns and projectiles, new weapons concepts, mine/countermine technology, and materials/phenomenology/modelling needed to accelerate the pace of advanced armor and munitions development.

(4) High Power Microwaves (HPM). The principal overall objective of this work is to develop a comprehensive understanding of the effects of HPM on tactical weapons systems and other military equipment to assure the survivability of US assets and to hold potentially vulnerable enemy systems at risk. A second important objective is to develop HPM weapons technology for possible use on tactical battlefields of the future. Primary efforts include work in the areas of effects testing, hardening, and systems components development.

(5) Special Technology Opportunities. The projects included in this category were selected based on their recognized importance to conventional defense, frequently broad applicability, and high payoff potential. The technology focus for each of these efforts was not identifiable with the four major thrust areas of the overall BTI program. Representative projects include work involving enhanced blast munitions,

superconducting ceramic materials, and cruise missile advanced guidance.

Summary charts that describe the overall program and each of the five categories are provided in an appendix to this prepared statement. Also included in the appendix are separate charts for each category that list the specific projects. Detailed descriptions for all of the projects were contained in the May 1987 report submitted to Congress.

Program Management

Following submission of the report to Congress, steps to implement the program were taken by suballocating the required funds to the Services and the Defense Agencies, primarily the Defense Advanced Research Projects Agency (DARPA). Approximately two-thirds of the program is being executed by the Services and about one-third by DARPA. A briefing-to-industry was presented in August 1987 to acquaint representatives of more than 300 potential participating organizations (primarily from industry, but with additional representatives from academia and national laboratories) with the overall objectives of the program and to provide information for each specific project. A comprehensive, unclassified document describing the program and identifying principal points-of-contact was prepared and widely distributed. Since that time, most work involving the publication of broad agency announcements and requests for

proposals, proposal evaluation and selection, and contracting has been completed, and the numerous technology development and demonstration efforts comprising the program are underway. For a number of projects, significant early progress has been made. A few projects have not yet been started primarily due to contracting delays. We expect these activities to begin soon.

The Balanced Technology Initiative program is being managed as a special RDT&E activity under my direction. The BTI work is considered to be an important new element of the DoD Science and Technology Program, which encompasses more than $5 billion of defense research and development. This program, under the direction and oversight of the Deputy Under Secretary for Research and Advanced Technology, includes much additional work related to conventional defense. A recent analysis indicated that more the 70% of this work supports the development of technologies important to conventional warfare, reflecting a longstanding US commitment to addressing this need. Nevertheless, the BTI projects are of great importance in allowing promising new work to be expeditiously started and in accelerating the transition of technology toward full-scale development and into the field.

I have recently completed an in-depth review of the entire BTI program. I examined ongoing work in each of the five program categories on a project-by-project basis. The detailed briefings were prepared and presented by Dr. William E. Snowden,

Special Assistant to the Deputy Under Secretary for Research and Advanced Technology. Dr. Snowden has had major responsibilities related to BTI program planning and implementation since funds for the program were appropriated early in Fiscal Year 1987. Specific objectives and the mission impact or military significance of each project were discussed, operational scenarios were described where appropriate, and project status - including funding - was reviewed. Participating in some of these reviews was Mr. Donald Fredericksen, Deputy Under Secretary for Tactical Warfare Programs, who has a keen appreciation for the contributions of emerging technological capabilities to developing conventional defense systems.

As a result of this in-depth review, I have become a stronger proponent of the BTI program. It is my judgment that the program we have developed is a sound one. The content overall reflects a reasonable balance of focused technology development work (about 60% of the overall program) and technology demonstration efforts (about 40%) that clearly offers significant near-term and longer-term opportunities for enhancing the capabilities of our conventional forces. Within each of the categories, the overall project activity is structured to support multiple, interrelated facets of the technology area being addressed. This is perhaps most evident in the Smart Weapons Technology category: several projects address problems related to the development of advanced sensors and seekers, while other projects deal with the development of

autonomous guidance and automatic target recognition capabilities required for their most effective use. But - significantly - the third project area within the category addresses the producibility of smart weapons components. This work recognizes that to enhance US and Allied conventional defense capabilities through the use of autonomous, fire-and-forget smart weapons, such weapons must be deployed in sufficient quantities to assure preparedness, promote deterrence, and provide for an effective and sustained response as required to meet critical mission objectives. This requirement can only be met if the costs of smart weapons can be reduced to levels considerably below costs associated with the manufacture of sophisticated weapons today - and if component (and hence system) reliability can be improved.

Numerous early program accomplishments were highlighted in the technical review. I want to mention a few of them today. For the High Performance IR Seeker project being executed by the Navy, structural and optical performance tests of IR domes have been carried out under hypersonic test conditions; these tests addressed a critical problem in the development of advanced missiles - the ability of an IR seeker to operate in the local high-temperature environment generated by hypersonic flight. Both nose-mounted and side-mounted seeker designs have been developed. For a DARPA project titled Automatic Target Recognition (ATR) for Smart Weapons, work by Lincoln Laboratory to upgrade an existing aircraft-mounted

multi-sensor suite has been completed. This suite represents "best-in-the-world" target detection and identification capability. For the Command Adjusted Trajectory (CAT) project being carried out by the Army, maneuverable command-adjusted projectiles have been designed, and successful wind tunnel tests have been completed; controlled trajectory-diversion capabilities have been demonstrated. CAT projectiles will enable ground combat vehicles to engage and defeat maneuvering airborne targets (helicopters). Finally, as a last example, for an Air Force project titled Cruise Missile Advanced Guidance, captive flight tests by two different defense contractors have demonstrated excellent sensor performance against simulated classified targets. Sensor performance is critical to achieving precision delivery accuracy and target destruction.

In completing this program review, I have also identified a few projects where some special management action may be necessary to assure that the overall objectives of the BTI program will continue to be met. In a few instances, lengthy startup delays in executing project work have been experienced. The implementation process - including planning by the executing organizations; proposal solicitation, review, and selection; and contracting - seems to be taking longer than necessary. Of course, delay is not necessarily bad; we are trying to spend all of the BTI resources wisely, not necessarily quickly. If it becomes necessary to redirect certain resources to other projects to assure their effective obligation, this action will

be taken. In another, more specific instance, we have some concerns regarding the project titled Tactical Missile Interceptor Technology. Our intent in this instance was to accelerate the development of guidance-and-control and warhead-and-fuze technologies critical to the performance of tactical missile interceptors needed to increase the survivability of US and Allied conventional forces and other military assets. The Army has instead pursued a much-broader set of objectives that I believe should be addressed in a more-comprehensive Army-funded Tactical Missile Defense program. We are currently working with the Army to resolve the matter.

I am aware that some concern has been expressed regarding the number of projects included in the BTI program as originally developed and reported to Congress. However, based on my recent detailed review of the program I do not see this situation as a significant problem. Several projects were supported for only one year to provide critically-needed funds for important activities already planned or in-progress. For example, BTI program support for the Advanced Short Takeoff/Vertical Landing (ASTOVL) Technology project helped to maintain early momentum on a joint US/UK effort initiated in 1986 as part of the NATO Cooperative Research and Development Program. In addition, one-time support for the development of an experimental flash x-ray test facility at Los Alamos National Laboratory was provided to accelerate progress in the development of advanced armors and armor-penetrating munitions under the DARPA/Army/Marine Corps

Armor/Anti-Armor Program. The original BTI program plan calls for some additional projects to be supported for only two years. Examples include the Digital Topographic Support System (DTSS) project, which is accelerating Army development of a combat terrain information system that will facilitate rapid planning and more effective execution of tactical battlefield operations; and the Navy project titled High Energy Laser for Ship Defense, which is conducting realistic lethality demonstrations to assess the potential of a high-energy laser to meet future surface ship defense requirements. About half of the projects have planned funding profiles extending over a five-year period. However, as prudent program management requires, continued funding for any specific project is contingent upon technical progress and accomplishments, updated assessment of payoff potential, and available resources.

Program Funding

Total funding committed to Balanced Technology Initiative program efforts initiated using the appropriated FY 1987 resources was $182 million. More than 85% of these resources have been obligated to date. For Fiscal Year 1988, the National Defense Authorization Act for Fiscal Years 1988 and 1989 authorized $300 million to continue the earlier BTI program activity and $200 million to start new projects. However, only $100 million was actually appropriated for the program.

Because of usual delays in starting up defense programs - delays associated with planning, solicitation and review of work proposals, and contracting - the BTI program is spending Fiscal Year 1987 funds well into 1988. An analysis of program obligation and expenditure rates to date has indicated that program continuity can be maintained into Fiscal Year 1989 using the $100 million appropriated in Fiscal Year 1988. To expand the program, an additional $100 million will be made available by reprogramming within RDT&E accounts of the Services. A higher level of funding for this program is not possible given total Fiscal Year 1988 resources. The reprogramming action is currently being processed within the Office of the Secretary of Defense, and the proposed package will be submitted to Congress soon.

The revised budget request for Fiscal Years 1988/1989 included a figure of $238 million to provide for orderly continuation of the program in that year. Funding plans for subsequent years are currently being developed.

BTI Work and Military Utility

The Balanced Technology Initiative is a technology development and demonstration program, as I emphasized in earlier remarks. However, in developing the BTI program plan, a sharp focus was maintained on operational need and potential armed forces utility. Technology development and demonstration

work alone does not improve the peacekeeping and warfighting capabilities of our military forces. It is the timely and effective implementation of promising new technologies that produces real battlefield benefits. In that regard, it is useful to view the activities of the BTI program from the perspective of existing US warfighting guides, in particular the AirLand Battle Doctrine of the Army and the Air Force, and the Navy Maritime Strategy. Many of the elements of AirLand Battle are also included in the NATO Follow-On Force Attack (FOFA) Doctrine.

AirLand Battle Doctrine embodies battle tactics developed primarily for conventional conflict in Europe. It recognizes that in any major future European conflict, US and Allied forces must be prepared - and able - to fight outnumbered and win. Basic elements of AirLand Battle include initiative, agility, depth, and synchronization. These elements are, of necessity, interrelated. In a clearer sense, what is required is the development of a fluid defense at the FLOT (forward line of troops); highly mobile forces over the range of the larger battlefield; an emphasis on counterattack capabilities, including the ability to maneuver in depth; the use of accurately-delivered, concentrated firepower (e.g., from artillery, aircraft, and deep battle weapons) to split the tactical and operational levels of war; and coordinated air and ground actions.

The BTI program can impact all of these areas. Efforts involving Digital Topographic Support System (DTSS) development, aided and automatic target recognition (ATR), an advanced data link, combat vehicle command and control, and advanced close air support technology may all contribute to improved force agility and more effective control of the flow of battle. Force mobility over greater distances will be enhanced by improvements in communications and surveillance systems, and by the accelerated development of new methods for mine clearing. BTI efforts related to improving counterattack capabilities for US conventional forces include much of the work in the Smart Weapons Technology program category: advanced sensor and seeker projects, projects involving autonomous guidance and ATR technology, a long-range sensor-fuzed weapon project (titled Deep Battle Weapon Concept), and work to develop guided tactical hypervelocity projectiles. Counterattack capabilities will be additionally enhanced through BTI-supported developments in the areas of advanced guns and kinetic energy weapons, as well as through work on advanced on- and off-route mines that can greatly restrict enemy freedom of action. Many of the just-mentioned Smart Weapons Technology development activities apply equally well in facilitating effective delivery of both short- and long-range ordnance. Effective firepower is critical to seizing the initiative by frustrating enemy commitment to a planned course of action.

Principles of naval warfare represented in the Navy Maritime Strategy cover three phases. Phase I addresses deterrence and the transition to war. This phase is characterized by forward deployment of naval forces worldwide, with aggressive positioning of ASW elements. Phase II involves seizing the initiative. Dominance is sought through forceful engagement of enemy submarine, surface, and air assets, together with amphibious action, mining, and mine-clearing as needed. Phase III continues the destruction of enemy vessels and other military targets, employs amphibious assault forces to regain territory, and provides available carrier air strength to support the land war.

The principal contribution of the BTI program to Phase I of the Maritime Strategy is through support for expanded work in the area of undersea surveillance. Knowledge of the locations and movements of enemy submarines improves our overall defense posture, thereby reducing the risk of war, but also promotes an effective, rapid response to open hostilities. Successful implementation of Phase II and Phase III requires effective ASW actions, surface ship and submarine self-protection capabilities, lethal and accurate weapons to strike at enemy targets, and materiel to support amphibious operations. Relevant BTI program work includes efforts to develop improved torpedo warheads, a submarine anti-torpedo weapon, high energy lasers for ship defense against cruise missile and tactical ballistic missiles (TBMs), advanced target acquisition

capabilities for ship defense, the CATFAE (Catapult-Launched Fuel-Air Explosive) surf zone mine-clearing system, and many of the Smart Weapons Technology projects.

We have also examined the BTI program activity and potential payoff in the context of the Conceptual Military Framework (CMF) developed by SACEUR. The CMF is intended to provide a "basis for establishing priorities for the selection and application of emerging technologies in meeting military requirements" for Allied Command Europe. It defines nine key mission components required for deterrence and defense and serves to identify deficiencies in current SHAPE (Supreme Headquarters Allied Powers Europe) military capabilities. One of these key mission components is FOFA (Follow-On Forces Attack). The correlation between BTI program activity and the military needs emphasized in the CMF is strong. I am very confident that BTI program successes will indeed promote significant enhancement of US and Allied conventional defense capabilities.

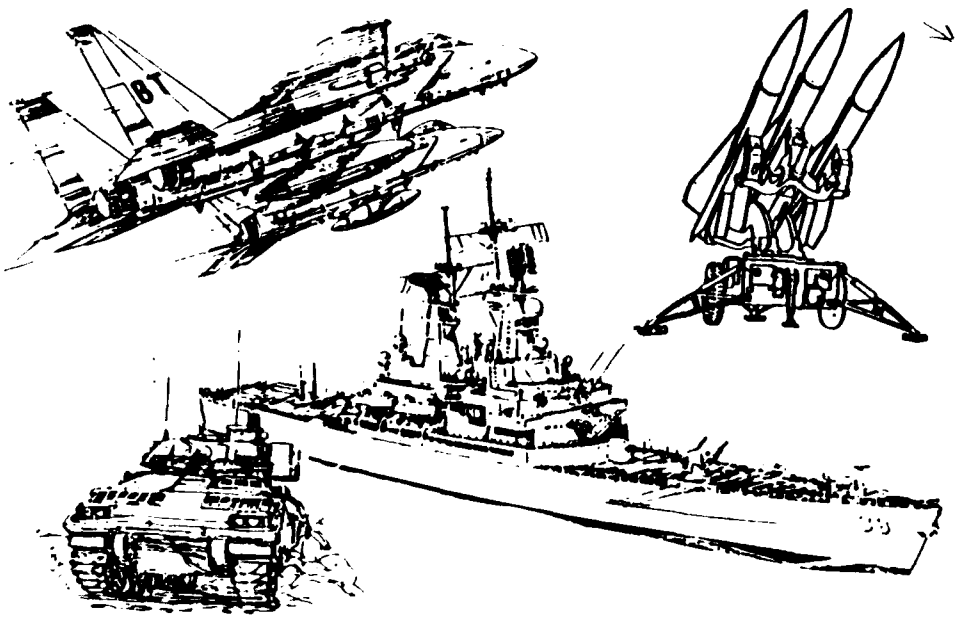
Concluding Remarks

In closing, I want to again affirm my strong support for the Balanced Technology Initiative and its objectives. The program has special importance in view of the recent INF Treaty and the growing need to improve the defensive capabilities of US and Allied conventional forces in Europe. ~~I believe that~~ the technology development and demonstration program ~~we have~~ implemented is a sound and responsive one that properly addresses both near-term and longer-term conventional defense needs. ~~We intend to provide~~ continuing effective development and management of the program to assure that its objectives and full potential will be realized. Maintaining a strong and balanced defense program is of critical importance for assuring the national security of the United States and the well being of our Allies now and into the future.

APPENDIX

BALANCED TECHNOLOGY INITIATIVE

CREATED TO EXPAND RESEARCH ON INNOVATIVE CONCEPTS AND METHODS OF ENHANCING CONVENTIONAL DEFENSE CAPABILITIES, AND TO FACILITATE RESTORATION OF THE CONVENTIONAL DEFENSE TECHNOLOGY BASE



PROGRAM CATEGORIES:

- **SMART WEAPONS TECHNOLOGY**
- **RSTA/BMC3 TECHNOLOGY**
- **ARMOR/ANTI-ARMOR TECHNOLOGY**
- **HIGH POWER MICROWAVES**
- **SPECIAL TECHNOLOGY OPPORTUNITIES**

PROVIDES OPPORTUNITY TO INCREASE RESEARCH AND DEVELOPMENT EFFORTS IN A FEW TECHNOLOGY AREAS CRITICAL TO CONVENTIONAL DEFENSE MISSIONS

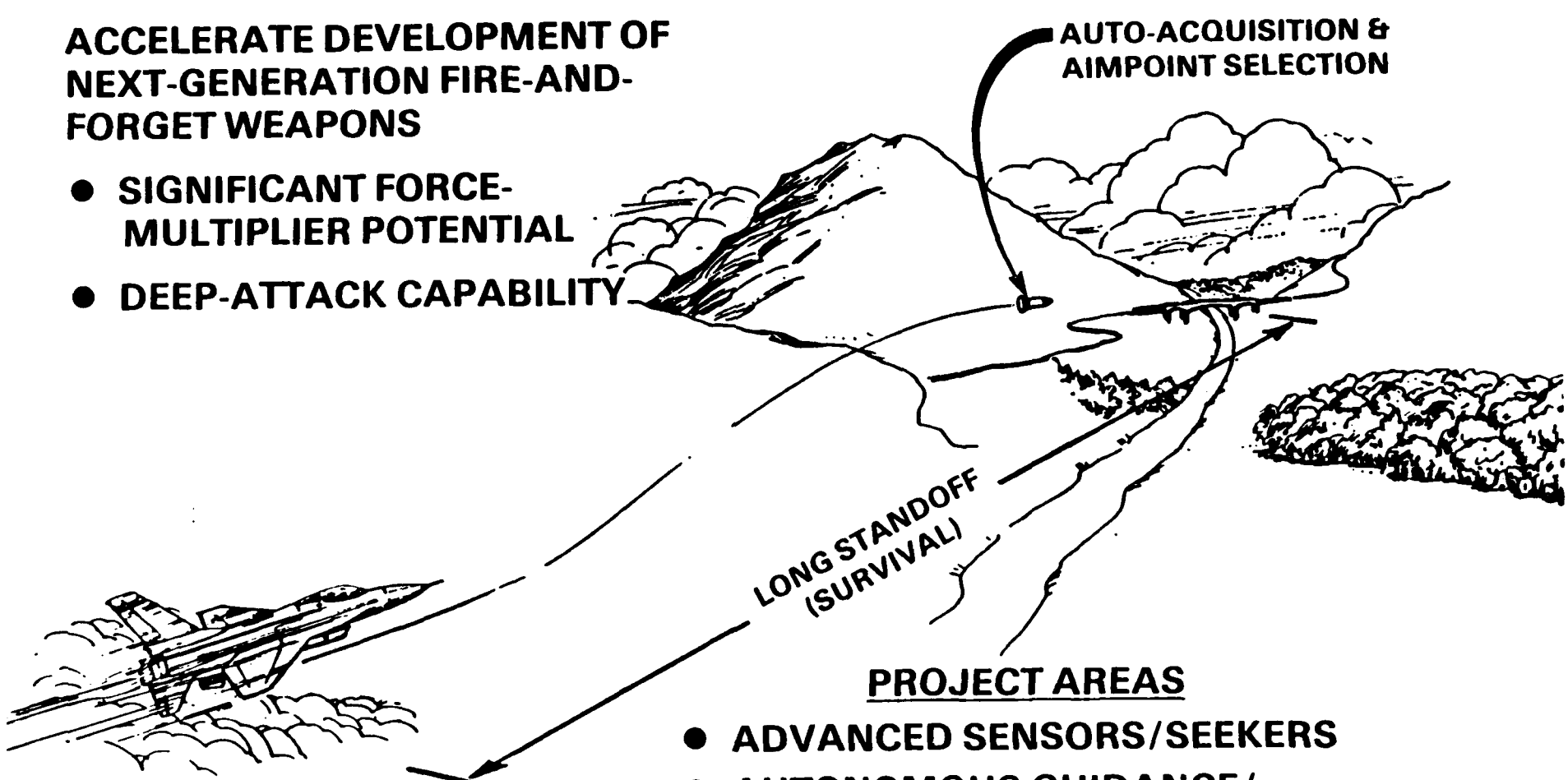
8.3406

BALANCED TECHNOLOGY INITIATIVE

SMART WEAPONS TECHNOLOGY

ACCELERATE DEVELOPMENT OF NEXT-GENERATION FIRE-AND-FORGET WEAPONS

- **SIGNIFICANT FORCE-MULTIPLIER POTENTIAL**
- **DEEP-ATTACK CAPABILITY**



PROJECT AREAS

- **ADVANCED SENSORS/SEEKERS**
- **AUTONOMOUS GUIDANCE/ TARGET RECOGNITION**
- **PRODUCIBILITY OF COMPONENTS**

8 3406

BALANCED TECHNOLOGY INITIATIVE

SMART WEAPONS TECHNOLOGY

OVERALL OBJECTIVE: TO ACCELERATE DEVELOPMENT OF TECHNOLOGIES OF CRITICAL IMPORTANCE TO NEXT-GENERATION FIRE-AND-FORGET, AUTONOMOUS WEAPONS EMPLOYED BY CONVENTIONAL FORCES

- IMPROVE TARGET ACQUISITION, IDENTIFICATION, AND HIT CAPABILITIES; DEVELOP TARGET PRIORITIZATION SCHEMES
- FOR BOTH SHORT- AND LONGER-RANGE ENGAGEMENTS
- PROVIDE SIGNIFICANT FORCE-MULTIPLIER POTENTIAL

PRINCIPAL PROJECT AREAS

- ADVANCED SENSORS/SEEKERS
- AUTONOMOUS GUIDANCE/AUTOMATIC TARGET RECOGNITION (ATR)
- PRODUCIBILITY OF COMPONENTS

8 3203

BALANCED TECHNOLOGY INITIATIVE
SMART WEAPONS TECHNOLOGY

ADVANCED SENSORS/SEEKERS

PAYOFF

- IMPROVE UTILITY OF EXISTING WEAPONS
- ENABLE DEVELOPMENT OF VERSATILE NEW WEAPONS

SPECIFIC PROJECTS

- MILLIMETER WAVE (MMW) SEEKER DEMONSTRATION
- HIGH PERFORMANCE INFRARED (IR) SEEKER
- JOINT IR/LASER SEEKER
- MULTI-MISSION SEEKER DEVELOPMENT

BALANCED TECHNOLOGY INITIATIVE
SMART WEAPONS TECHNOLOGY

AUTONOMOUS GUIDANCE & AUTOMATIC TARGET RECOGNITION

PAYOFF

- PRECISION DELIVERY TO SELECTED TARGETS
- DEEP ATTACK CAPABILITY (FIRE-&-FORGET)
- INCREASED SURVIVABILITY, REDUCED CASUALTIES

SPECIFIC PROJECTS

- AUTONOMOUS GUIDANCE FOR CONVENTIONAL WEAPONS
- AUTOMATIC TARGET RECOGNITION FOR SMART WEAPONS
- SUBMARINE ANTI-TORPEDO WEAPON
- DEEP BATTLE WEAPON CONCEPT
- GUIDED TACTICAL HYPERVELOCITY PROJECTILES

8-3367

BALANCED TECHNOLOGY INITIATIVE
SMART WEAPONS TECHNOLOGY

PRODUCIBILITY OF SMART WEAPONS COMPONENTS

PAYOFF

- GREATER AFFORDABILITY
- INCREASED RELIABILITY
- PRODUCTION SCHEDULES FOR WEAPON SYSTEMS

SPECIFIC PROJECTS

- MONOLITHIC IR FOCAL PLANE ARRAYS
- EXPERT SYSTEMS FOR MANUFACTURE OF SMART WEAPONS COMPONENTS
- IRFPA PRODUCIBILITY

8-3367

BALANCED TECHNOLOGY INITIATIVE

RSTA/BMC3 TECHNOLOGY

ADVANCED TECHNOLOGIES CRITICAL TO OBTAINING, PROCESSING, PASSING, AND USING INFORMATION

- **ENABLES MORE EFFECTIVE USE OF COMBAT FORCES**

PROJECT AREAS

- SURVEILLANCE
- TARGETING
- INFORMATION MANAGEMENT

8 3405

BALANCED TECHNOLOGY INITIATIVE

RSTA/BMC3 TECHNOLOGY

OVERALL OBJECTIVE: TO ADVANCE TECHNOLOGIES IMPORTANT IN OBTAINING, PROCESSING, PASSING AND USING INFORMATION VITAL TO MAXIMIZING BATTLEFIELD PERFORMANCE OF CONVENTIONAL FORCES

- INFORMATION CAN PROVIDE A STABILIZING EFFECT IN TIMES OF CRISIS
- ENHANCE PRE-CONFLICT POSTURING OF DEFENSE FORCES AND POST-ATTACK RETALIATORY CAPABILITIES (OFFENSIVE/DEFENSIVE)
- FIND, FIX, TARGET, AND ENGAGE ENEMY FORCES AND ASSETS
- PROMOTE HIGH LEVELS OF ECONOMY OF FORCE

PRINCIPAL PROJECT AREAS

- SURVEILLANCE TECHNOLOGY
- TARGETING TECHNOLOGY
- INFORMATION MANAGEMENT

BALANCED TECHNOLOGY INITIATIVE
RSTA/BMC3

SURVEILLANCE TECHNOLOGY

PAYOFF

- PROVIDES DETAILED INFORMATION ON LOCATION AND POSTURE OF ENEMY FORCES
- PROMOTES EFFECTIVE COUNTERACTION

SPECIFIC PROJECTS

- UNDERSEA SURVEILLANCE
- TACNAT
- DTSS

8-3367

BALANCED TECHNOLOGY INITIATIVE
RSTA/BMC3

TARGETING TECHNOLOGY

PAYOFF

- ALLOWS SELECTIVE CONCENTRATION OF FIREPOWER
- INCREASES OVERALL EFFECTIVENESS OF OUTNUMBERED FORCES - HIGH INTENSITY CONFLICT
- ONE-SHOT ONE-KILL CAPABILITY

SPECIFIC PROJECTS

- TARGET ACQUISITION FOR SHIP DEFENSE
- AIDED TARGET RECOGNITION
- FIBER OPTIC DATA LINK FOR AIR LAUNCHED WEAPONS

BALANCED TECHNOLOGY INITIATIVE
RSTA/BMC3

INFORMATION MANAGEMENT

PAYOFF

- CRITICAL TO RAPID PROCESSING/TRANSFERRING OF BATTLEFIELD DATA AND PLANS
- MORE EFFECTIVE BATTLEFIELD OPERATIONS-BETTER COORDINATION/SYNCHRONIZATION OF ACTIONS

SPECIFIC PROJECTS

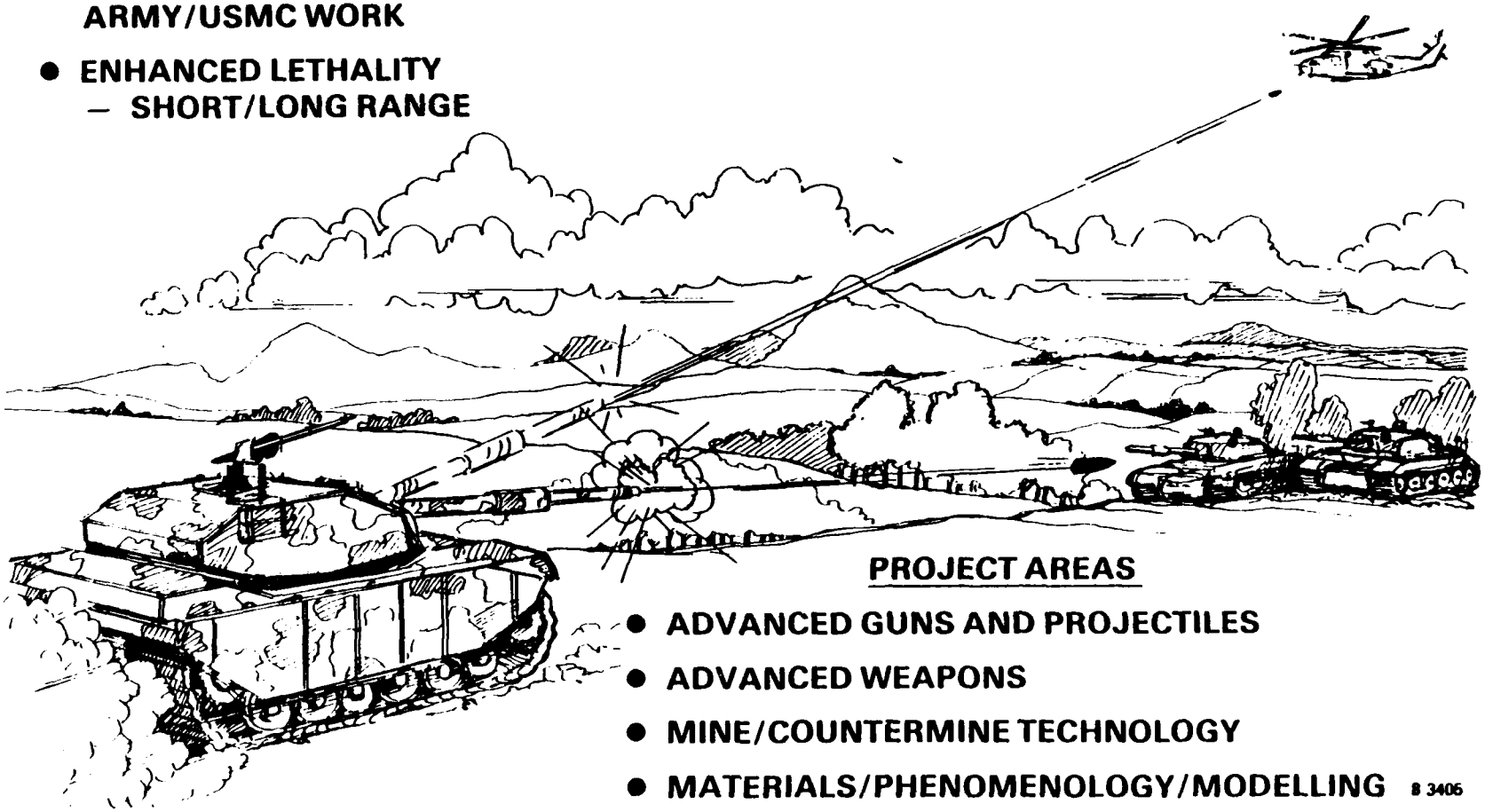
- COMBAT VEHICLE COMMAND AND CONTROL
- OPTICAL SIGNAL PROCESSING TECHNOLOGY
- MULTI-SENSOR AUTOPROCESSOR TECHNOLOGY

BALANCED TECHNOLOGY INITIATIVE

ARMOR/ANTI-ARMOR TECHNOLOGY

INCREASE SURVIVABILITY AND RETALIATORY WARFIGHTING CAPABILITY OF US/ALLIED FORCES

- **EXPAND ONGOING DARPA/ ARMY/USMC WORK**
- **ENHANCED LETHALITY**
  - **SHORT/LONG RANGE**



PROJECT AREAS

- **ADVANCED GUNS AND PROJECTILES**
- **ADVANCED WEAPONS**
- **MINE/COUNTERMINE TECHNOLOGY**
- **MATERIALS/PHENOMENOLOGY/MODELLING**

B 3405

BALANCED TECHNOLOGY INITIATIVE

ARMOR/ANTI-ARMOR TECHNOLOGY

OVERALL OBJECTIVE: TO PROMOTE INCREASED SURVIVABILITY AND MORE EFFECTIVE RETALIATORY WARFIGHTING CAPABILITY FOR U.S. CONVENTIONAL FORCES

- EXPAND ONGOING WORK CONCERNED WITH THE DEVELOPMENT OF ADVANCED ARMOR AND ANTI-ARMOR WEAPONS SYSTEMS
- COMPLEMENTARY/SUPPLEMENTARY TO EXISTING DARPA/ARMY/USMC PROGRAM
- INCLUDES BOTH SYSTEM-SPECIFIC PROJECTS AND IMPORTANT TECHNOLOGY BASE ACTIVITIES

PRINCIPAL PROJECT AREAS

- ADVANCED GUNS AND PROJECTILES
- ADVANCED WEAPONS
- MINE/COUNTERMINE TECHNOLOGY
- MATERIALS/PHENOMENOLOGY/MODELLING

BALANCED TECHNOLOGY INITIATIVE
ARMOR/ANTI-ARMOR TECHNOLOGY

ADVANCED GUNS & PROJECTILES

PAYOFF

- SIGNIFICANT IMPROVEMENTS IN ANTI-ARMOR FIREPOWER
- HIGHER VELOCITIES - BETTER ACCURACY, GREATER LETHALITY

SPECIFIC PROJECTS

- ENHANCED KINETIC ENERGY WEAPONS
- LIQUID PROPELLANT GUN
- ADVANCED COMPOSITE GUN
- COILGUN TECHNOLOGY DEVELOPMENT

BALANCED TECHNOLOGY INITIATIVE
ARMOR/ANTI-ARMOR TECHNOLOGY

ADVANCED WEAPONS

PAYOFF

- NEW WAYS TO DEFEAT HARD TARGETS
- TANKS, COMBAT-SUPPORT AIRCRAFT, DOUBLE-HULLED SUBMARINES

SPECIFIC PROJECTS

- SHORT RANGE ANTI-TANK WEAPON
- COMMAND ADJUSTED TRAJECTORY
- FOLLOW-THROUGH TORPEDO WARHEAD
- GROUND-LAUNCHED HELLFIRE

8-3367

BALANCED TECHNOLOGY INITIATIVE
ARMOR/ANTI-ARMOR TECHNOLOGY

MINE/COUNTERMINE TECHNOLOGY

PAYOFF

- FACILITATES ATTRITION, DELAY, DISRUPTION OF ENEMY OFFENSIVE MANEUVERS
- ENABLES BREACHING OF MINE BARRIERS, EXECUTION OF FAST-PACED ASSAULTS

SPECIFIC PROJECTS

- ADVANCED MINE/COUNTERMINE TECHNOLOGY
- AMPHIBIOUS ASSAULT COUNTERMINE SYSTEM

BALANCED TECHNOLOGY INITIATIVE
ARMOR/ANTI-ARMOR TECHNOLOGY

MATERIALS/PHENOMENOLOGY/MODELLING

PAYOFF

- GREATER FLEXIBILITY & ACCELERATED DESIGN/ DEVELOPMENT/EVALUATION OF MILITARY SYSTEMS
- MORE-AFFORDABLE HIGH-PERFORMANCE ARMOR & ADVANCED MUNITIONS

SPECIFIC PROJECTS

- ARMOR MATERIALS
- ENHANCED COMPUTATIONAL CAPABILITIES FOR ADVANCED WEAPON SYSTEM DEVELOPMENT
- PENETRATOR/TARGET INTERACTION FLASH X-RAY FACILITY

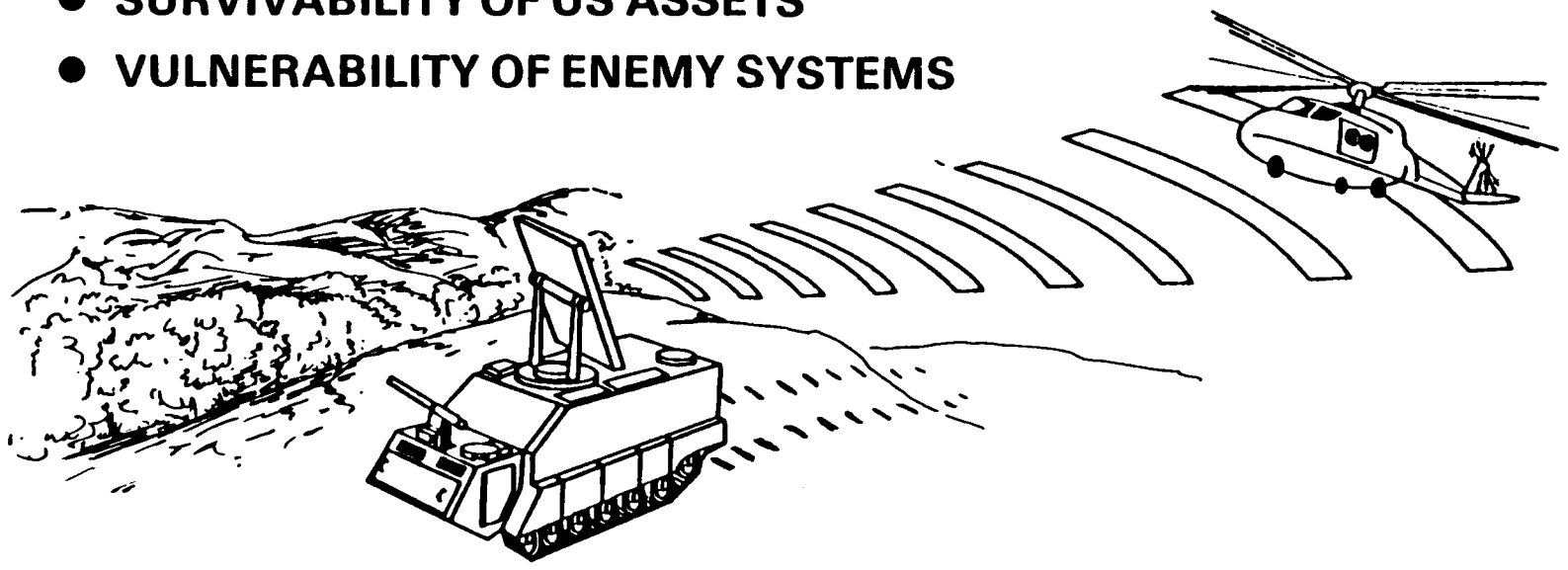
8-3367

BALANCED TECHNOLOGY INITIATIVE

HIGH POWER MICROWAVES

DEVELOP COMPREHENSIVE UNDERSTANDING OF HPM EFFECTS — PROBLEMS/POTENTIAL

- SURVIVABILITY OF US ASSETS
- VULNERABILITY OF ENEMY SYSTEMS



PROJECT AREAS — EFFECTS, HARDENING, COMPONENTS, PROPAGATION/PHENOMENOLOGY, METHODOLOGY

8 3405

BALANCED TECHNOLOGY INITIATIVE

HIGH POWER MICROWAVES (HPM)

OVERALL OBJECTIVE: TO DEVELOP A COMPREHENSIVE UNDERSTANDING OF THE EFFECTS OF HPM ON TACTICAL WEAPONS SYSTEMS TO ENSURE SURVIVABILITY OF U.S. ASSETS AND TO HOLD POTENTIALLY VULNERABLE ENEMY SYSTEMS AT RISK

- DETERMINE SUSCEPTIBILITY OF U.S. AND FOREIGN WEAPONS SYSTEMS AND COMPONENTS TO HPM
- DEVELOP HARDENING TECHNOLOGY REQUIRED TO INCREASE SURVIVABILITY OF U.S. ASSETS
- DEVELOP HPM WEAPONS TECHNOLOGY FOR POSSIBLE USE ON TACTICAL BATTLEFIELDS OF THE FUTURE

WORK AREAS: EFFECTS TESTING, HARDENING, COMPONENTS DEVELOPMENT, PROPAGATION/ PHENOMENOLOGY, AND METHODOLOGY

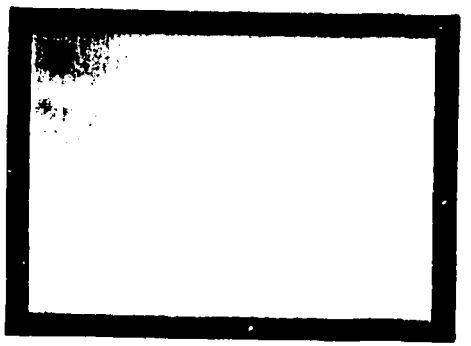
HIGH POWER MICROWAVE PROJECTS

- HPM EFFECTS TESTING
- HMP HARDENING
- HPM COMPONENTS DEVELOPMENT
- HPM PROPAGATION/PHENOMENOLOGY
- HPM METHODOLOGY

BALANCED TECHNOLOGY INITIATIVE

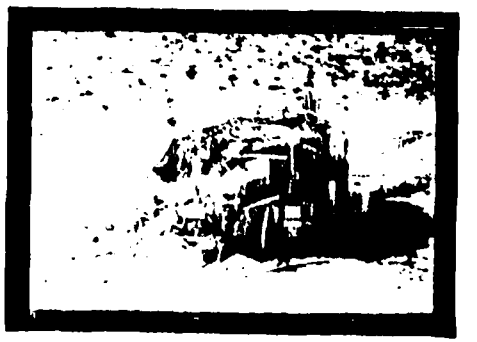
SPECIAL TECHNOLOGY OPPORTUNITIES

- HIGH PAYOFF POTENTIAL
- TECHNICAL FOCUS OUTSIDE 4 MAJOR THRUST AREAS



REPRESENTATIVE PROJECTS

- ENHANCED BLAST MUNITIONS
- CRUISE MISSILE ADVANCED GUIDANCE
- ADVANCED CLOSE AIR SUPPORT TECHNOLOGY



8 3405

BALANCED TECHNOLOGY INITIATIVE
SPECIAL TECHNOLOGY OPPORTUNITIES

PROJECTS INCLUDED IN THE BTI PROGRAM IN VIEW OF THEIR RECOGNIZED IMPORTANCE TO CONVENTIONAL DEFENSE

- HIGH PAYOFF POTENTIAL
- TECHNOLOGY FOCUS NOT IDENTIFIABLE WITH 4 MAJOR THRUST AREAS

SPECIAL TECHNOLOGY OPPORTUNITY PROJECTS

- TACTICAL MISSILE INTERCEPTOR TECHNOLOGY
- HIGH ENERGY LASER FOR SHIP DEFENSE
- ENHANCED BLAST MUNITIONS
- ASTOVL TECHNOLOGY
- ACTIVE OPTICAL COUNTERMEASURES (AOCM)
- HIGH POWER/ENERGY DENSITY BATTERIES
- SUPERCONDUCTING CERAMIC MATERIALS
- CRUISE MISSILE ADVANCED GUIDANCE
- ADVANCED CLOSE AIR SUPPORT TECHNOLOGY

END

DATE

FILMED

5-88

DTIC